United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

A SYSTEM OF FILING AND ROUTING SAMPLES OF CHEMICALS FOR INSECTICIDE TESTING 1/

By Marion W. Oberg, Howard A. Jones, and E. F. Knipling,
Division of Insects Affecting Man and Animals

From April 1942 to October 1945 the Orlando, Fla., laboratory received 10,368 samples of chemicals for testing as insecticides and repellents. The numbers of samples received from various sources during two 6-month periods—the first early in the project and the second for a recent period of operation—are shown in table 1. The largest number of samples received in a single month was 949 for March 1945.

Table 1.—Samples received by the Orlando laboratory in two 6-month periods from various sources.

Date	Commercial	Government	Universities under contract with O.S.R.D.	Total
1942				
July	149	90	—	239
August	161	14	—	175
September	111	35	—	146
October	57	48	—	105
November	66	34	—	100
December	70	76	—	146
Total	614	297		911
1945				
January	80	32	271	383
February	60	25	264	349
March	365	48	536	949
April	118	29	220	367
May	119	114	340	573
June	219	114	227	560
Total	961	362	1858	3181

1/ This work was conducted under a transfer of funds, recommended by the Committee on Medical Research, from the Office of Scientific Research and Development to the Bureau of Entomology and Plant Quarantine.

To handle this large number of materials expeditiously it was necessary to develop a system of filing and of routing. The methods used in this laboratory are given briefly here for the benefit of other laboratories that may be required to handle samples in large numbers for insecticidal testing.

Filing

Each compound was assigned a code number. To prevent duplication in testing, samples were first checked to see whether they had previously been received. Any duplicate samples were assigned a subletter under the original code number. Master code books were maintained which included the code number, date of coding, name and source of sample, date of letter of transmittal, amount, and whether solid or liquid. If the sample was a single compound, the molecular formula was included. Four card files of samples were maintained--namely, a molecular-formula file, an alphabetical name file, a structural-formula file, and a code-number file.

Most of the samples received were individual organic compounds. The molecular-formula file was maintained principally to facilitate the checking for duplication of materials, and was particularly useful when a compound was received under different names.

The alphabetical name file was especially useful in checking for duplication of materials for which no molecular formula could be written, such as natural products, prepared mixtures, and proprietary materials. This index also served as a further check in preventing duplication of organic compounds. Since these cards also contained the code number, they served as a simple means for the staff to locate a desired material on the stock shelves.

The structural-formula file was set up so that chemically related organic compounds could be located easily and rapidly. This file proved useful in following out relationships between insecticidal or repellent properties and chemical structure. For example, if a certain substance proved to have miticidal value, other compounds of closely related structure were selected for further testing. Organic compounds were classified as hydrocarbons, alcohols, ethers, acids, esters, aldehydes, ketones, amines, amides, sulfur compounds, etc. Some of these classes were divided into subclasses. For example, alcohols were divided into mono-, di-, and poly-hydric alcohols; esters were divided into esters of mono-, di-, tri-, and poly-basic acids; and sulfur compounds were divided into sulfides, sulfones, sulfoxides, and sulfonamides. Compounds having more than one characteristic group

were listed under the last class in which they could be placed. For example, hydroxyacids were placed under acids, and ether-esters under esters. These mixed functions were grouped in separate subclasses so that the groups would be small and comprise closely related compounds. In general, in each class or subclass the aliphatic and alicyclic compounds were listed first in order of increasing carbon content, then aromatic compounds in the same order. Compounds containing nitro or halogen groups were not placed in separate classes or subclasses, but were placed immediately after the corresponding compounds without such groups. For example, p-nitrobenzoic acid, ethyl ester, followed benzoic acid, ethyl ester.

The code-number file was maintained for identification of samples when they were referred to only by number, as in laboratory notes.

Routing

When a sample had been assigned a code number, it was prepared for testing and routed to the various entomological sections of the laboratory for evaluation. Materials were routinely screened as lousicides and louse ovicides, miticides, mosquito larvicides, and mosquito repellents. Samples were usually grouped in lots as received and routed in these groups. For some of the routine tests solutions of the samples were prepared.

A data sheet accompanied the samples to facilitate assembling and reporting of the results. The sheet gave the source of the samples, the date of the letter of transmittal, the code numbers and names of the samples, and allowed space for entering the entomological data. The data sheet was made in triplicate--one copy to be retained by the chemistry section, another by the entomological section making the test, the third, with complete data, to be returned with the samples to the chemistry section. A copy of the completed data sheet was attached to the incoming letter of transmittal and forwarded to the stenographic section for typing of the letter reporting the results obtained. When the testing was completed all the samples for the group were shelved according to their code numbers.

In most cases individual sets of data were reported as obtained. For example, if data on the repellent effect of a group of samples were received first, the results were immediately reported to the source; later when larvicidal results were received, they were reported, and so on. In special cases, however, the data for the entire group

were held until all entomological results were complete, and then assembled and reported as a whole. In general the entire testing and reporting procedures required from 1 to 3 months.

To facilitate locating samples during the testing period, as well as to ascertain quickly when the results on samples had been reported, routing books were kept in which the dates of assignment to, and return by, each section were recorded.

Subsamples of all liquids to be tested as repellents were submitted to the U. S. Food and Drug Administration for simple irritation tests to determine whether they were safe for application to the skin, before they were tested for repellency. In the meantime they were tested for their insecticidal and miticidal properties. Any liquids reported by the Food and Drug Administration as unsafe for skin testing were prepared in solution and submitted to the repellent section of the laboratory for tests on cloth. Usually all data on repellency from both skin and cloth tests was assembled before a report was made.